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and occasionally a laparoscopic procedure must be converted to an open laparotomy by making a longer incision. This might be necessary if there is bleeding, the small bowel cannot be kept out of the way, there are extensive adhesions or scar tissue, or the problem cannot be clearly seen or managed. Above all, the surgeon must feel that the operation is going well and is as safe as possible.

The operation is performed through several 1 inch incisions. Metal or plastic tubes (ports) with a sealing cap are placed through these incisions, and the abdomen is distended with carbon dioxide gas like a tent or dome. A laparoscope attached to a camera is placed through one of the ports and connected to a video monitor to allow the surgeon and assistants to see inside the abdomen. Long, specially-designed laparoscopic instruments are used through the ports to perform the surgery. A short incision (3 inches) is made to remove the organ or bowel once it is completely freed. The ends of the remaining bowel may be connected back together (an anastomosis) or an ostomy (ileostomy, colostomy – bowel connected to the skin) may be mad.

ROBOT-ASSISTED SURGERY

Robot-assisted surgery is a very new form of minimally invasive surgery and is only starting to be applied to colon and rectal surgical problems. Dr. Orkin was the first surgeon to use robots to help perform colon operations in the Boston area. The DaVinci robot is currently the only device approved for clinical use in humans. Nationally, the most common procedure performed robotically is radical prostatectomy (complete removal of the prostate gland in men) for prostate cancer. As much as 90% of prostatectomies are performed with the robot now. Surgeons have begun to perform certain other operations with the robot including hysterectomy (removal of the uterus) and cystectomy (removal of the bladder). Only a few colon and rectal surgeons have started to use the robot for colon surgery.

Robotic surgery is an extension of laparoscopic surgery. Similar ports are used through small incisions, and the abdomen is distended with carbon dioxide gas. There are several major advantages to robotic surgery including a better view than with a laparoscope. The robotic videoscope is binocular – it uses two cameras, one for each eye, which gives the surgeon a three-dimensional view and better depth perception. The robotic instruments have a "wrist" which bends in 6 directions. This mimics the natural movement of the surgeon's wrist and is more flexible than laparoscopic instruments, allowing the surgeon to get around corners, to sew and to retract much better than possible with laparoscopy. Once the ports are placed and the abdomen is explored, the surgeon works from a console with remote control of the robot while the assistant and nurse remain next to the patient.

Similar to laparoscopic surgery, not all procedures can be performed robotically. The robotic approach works best when the problem and operation are limited to one side of the abdomen. Appropriate operations might include a right hemicolectomy, a left hemicolectomy, a sigmoid resection or a low anterior resection. When a large portion of the colon is to be manipulated or removed, as with a total colectomy, a proctocolectomy or an ileo-anal procedure, laparoscopy or open surgery are better choices. Occasionally, a robotic procedure must be converted to an open laparotomy by making longer incision. This might be necessary if there is bleeding, the small bowel cannot be kept out of the way, there are extensive adhesions or scar tissue, or the problem cannot be clearly seen or managed. As with all surgery, the surgeon must feel that the operation is going well and is as safe as possible.

To make an appointment or ask a question, call the Division of Colon and Rectal Surgery at 617-636-6190.

For urgent problems, call the Tufts Medical Center operator at 617-636-5000 and ask for the on-call physician for Colon and Rectal Surgery.

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09-062

Approaches to Abdominal Colorectal Surgery

Surgical Options

Tufts Medical Center

OPEN ABDOMINAL SURGERY — LAPAROTOMY

Abdominal surgery has been performed routinely since the invention of anesthesia in the late 1800's. Until the late 1980's open surgery through a long incision was the only way to remove abdominal organs. This is still the preferred approach for many problems and many patients, especially for complex procedures or in patients with extensive scar tissue and adhesions.

A fairly long incision is generally necessary for open surgery. This may be from 6 to 12 inches long. Often, the incision is made in the middle of the abdomen, going up and down from the umbilicus (belly button). Occasionally, a transverse or oblique (across the abdomen) incision is used. The organs are manipulated with the surgeons hands and standard surgical instruments. The incision is closed with sutures and/or steel staples, closing the muscle and fascial layers and then closing the skin. If staples are used in the skin, they will be removed 7-10 days after surgery.

One major advantage of open surgery is that the surgeon can feel the tissues and use his or her hands to help find the disease or tumor. This tactile feedback or sensation is minimal when using long laparoscopic instruments and is absent with the robot.

LAPAROSCOPIC SURGERY

Laparoscopic surgery has been used for colon surgery since about 1990. Dr. Orkin was in the first group of surgeons to adopt this method in December of 1990. He has performed several hundred laparoscopic colon and rectal surgeries, and laparoscopic surgery is the first line approach to most abdominal problems in his practice.

Laparoscopic surgery offers significant advantages over open surgery including smaller incisions (generally 2 to 3 one inch incisions and one 3 inch incision used to remove the resected tissue), less pain, better cosmesis (appearance), shorter hospital stay, and more rapid overall recovery and return to full activity. However, not all procedures can be performed laparoscopically,

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PROS AND CONS OF ABDOMINAL APPROACHES

TYPE OF SURGERY	SURGERY PROS	SURGERY CONS	HOSPITAL STAY	RECOVERY
Open Abdominal Surgery — Laparotomy	• Better view • Less likely to miss something • Surgeon can feel and handle tissues • Better management of difficult problems	• Longer hospital stay • Longer recovery • Longer incision • More pain	5–7 days	5–6 weeks
Laparoscopic Surgery	AS COMPARED TO LAPAROTOMY: • Shorter incisions • Fewer adhesions • Shorter hospital stay • Faster recovery	AS COMPARED TO LAPAROTOMY: • More incisions than open • May need to convert to open laparotomy • More limited view of entire abdomen; abnormalities or bleeding may be missed • Minimal surgical feel • Longer procedure • Complex procedures may be difficult	4–5 days	3–4 weeks
Robot-Assisted Surgery	AS COMPARED TO LAPAROTOMY: • Shorter incisions • Fewer adhesions • Shorter hospital stay • Faster recovery AS COMPARED TO LAPAROSCOPY: • Better view including binocular vision with 3D view • Faster surgery • Able to get around corners and manage problems difficult to do with laparoscopy	AS COMPARED TO LAPAROTOMY: • More incisions than open • May need to convert to open laparotomy • More limited view of entire abdomen; abnormalities or bleeding may be missed • Minimal surgical feel • Longer procedure AS COMPARED TO LAPAROSCOPY: • More expensive for the hospital • No surgical feel	3–4 days	3–4 weeks

Each of these approaches to abdominal surgery has its advantages and disadvantages. Your surgeon will discuss these with you and make a recommendation as to the best approach for you.

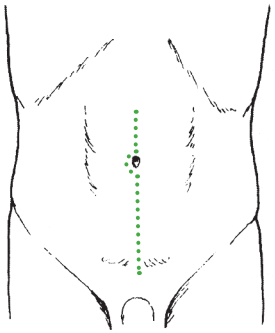

FIGURE 1
OPEN LAPAROTOMY

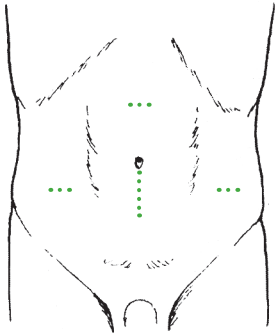

FIGURE 2
LAPAROSCOPY
VERTICAL INCISION

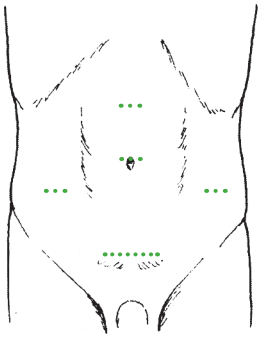

FIGURE 3
LAPAROSCOPY
LOW TRANSVERSE INCISION

For more information call the Division of Colon and Rectal Surgery at Tufts Medical Center: **617-636-6190**
or visit **www.tuftsmedicalcenter.org/OurServices/SurgicalServices/ColonRectalSurgery**